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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/760,376	01/21/2004	Shoji Mochizuki		9823
7590	07/11/2006			EXAMINER SKOWRONEK, KARLHEINZ R
George A. Loud, Esquire BACON & THOMAS Fourth Floor 625 Slaters Lane Alexandria, VA 22314-1176			ART UNIT 1631	PAPER NUMBER
DATE MAILED: 07/11/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/760,376	MOCHIZUKI ET AL.
	Examiner	Art Unit
	Karlheinz R. Skowronek	1631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 24 January 2006.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-6 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ . |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date (<u>1 sheet</u>). | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ . |

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 05 March 2004, as 1 sheet, was filed after the mailing date of the application on 21 January 2004. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement has been considered by the examiner.

Oath/Declaration

The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:
It does not identify the citizenship of each inventor.
It was not executed in accordance with either 37 CFR 1.66 or 1.68.
It does not include an apostille, a consular certificate, or the position of authority of the officer signing an apostille or consular certificate, see 37 CFR 1.66(a).

Claim Rejections - 35 U.S.C. § 101 (non-statutory invention)

1. Claims 3 and 4 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The rejection is revised in more details in view of recently released "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility"¹. The following analysis of facts of this particular patent application follows the analysis suggested in the "Guidelines". Note that the text of the Guidelines is italicized.

Section 101 of title 35, United States Code, provides:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

To satisfy section 101 requirements, the claim must be for a practical application of the § 101 judicial exception, which can be identified in various ways (Guidelines, p. 19):

- *The claimed invention “transforms” an article or physical object to a different state or thing.*
- *The claimed invention otherwise produces a useful, concrete and tangible result, based on the factors discussed below.*

In the instant case, the claimed invention does not “transform” an article or physical object to a different state or thing. This does not preclude the subject matter to be patentable as, for eligibility analysis, as

physical transformation “is not an invariable requirement, but merely one example of how a mathematical algorithm [or law of nature] may bring about a useful application.” AT&T, 172 F.3d at 1358-59, 50 USPQ2d at 1452. If the examiner determines that the claim does not entail the transformation of an article, then the examiner shall review the claim to determine if the claim provides a practical application that produces a useful, tangible and concrete result. In determining whether the claim is for a “practical application,” the focus is not on whether the steps taken to achieve a particular result are useful, tangible and concrete, but rather that the final result achieved by the claimed invention is “useful, tangible and concrete.” The claim must be examined to see if it includes anything more than a § 101 judicial exception. If the claim is directed to a practical application of the § 101 judicial exception producing a result tied to the physical world that does not preempt the judicial exception, then the claim meets the statutory requirement of 35 U.S.C. § 101. If the examiner does not find such a practical application, the examiner has determined that the claim is nonstatutory. (Guidelines, p. 20)

In the instant case, the question is thus whether the final result achieved by the claimed invention produces a result which satisfies all three criteria of being useful, and concrete, and tangible. In determining if the instant claims are useful, tangible, and

¹ Available at http://www.uspto.gov/web/offices/pac/dapp/opla/preognitice/guidelines101_20051026.pdf

concrete, the Examiner must determine each standard individually. For a claim to be "useful," the claim must produce a result that is specific, substantial, and credible. For a claim to be "tangible," the claim must set forth a practical application of the invention that produces a real-world result. For a claim to be "concrete," the process must have a result that can be substantially repeatable or the process must substantially produce the same result again. Furthermore, the claim must recite a useful, tangible, and concrete result in the claim itself. In addition, a claim must be limited only to statutory embodiments. Thus, if the claim is broader than the statutory embodiments of the claim, the Examiner must reject the claim as non-statutory.

(1) **"USEFUL RESULT"** *For an invention to be "useful" it must satisfy the utility requirement of section 101, i.e., it has to be (i) specific, (ii) substantial and (iii) credible.*

When the examiner has reason to believe that the claim is not for a practical application that produces a useful result, the claim should be rejected, thus requiring the applicant to distinguish the claim from the three § 101 judicial exceptions to patentable subject matter by specifically reciting in the claim the practical application. In such cases, statements in the specification describing a practical application may not be sufficient to satisfy the requirements for section 101 with respect to the claimed invention. Guidelines, p. 21.

If the specification discloses a practical application of a § 101 judicial exception, but the claim is broader than the disclosure such that it does not require a practical application, then the claim must be rejected. Guidelines, p. 21:

(2) "**TANGIBLE RESULT**" *The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a § 101 judicial exception, in that the process claim must set forth a practical application of that § 101 judicial exception to produce a real-world result. The opposite meaning of "tangible" is "abstract."*

The instant claims are drawn to a method of estimating electromagnetic compatibility between a body acting as an electromagnetic scatterer and a source of electromagnetic radiation. However, the method as claimed does not include a real world result. For example, method as claimed may take place entirely within the confines of a computer or human mind without any communication to the outside world. Thus, the instant claims do not include any tangible result.

(3) "**CONCRETE RESULT**" *Usually, this question arises when a result cannot be assured. In other words, the process must have a result that can be substantially repeatable or the process must substantially produce the same result again. The opposite of "concrete" is unrepeatable or unpredictable.*

In the instant case, the method relies on the convergence of two computational processes based on previously stored data. Convergence is irrevocably linked to and dependent on the previously stored data. Since the claims do not specify the previously stored data, any previously stored data could be used in the calculation making the convergence unpredictable and unrepeatable. Thus the instant claims do not include a concrete result.

Thus, the final result achieved by the claimed invention is neither tangible nor concrete. Consequently, the method produces a result which does not satisfy all three criteria of being useful, and concrete, and tangible.

Claim Rejections - 35 USC § 112, Second Paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

2. In the instant case, in claims 1, 3, and 5, the phrase "a living body is divided into grids" is vague. It is unclear how this phrase should be interpreted.
3. In claims 1-6, the use of the phrase "biological electromagnetic compatibility" is vague. It is unclear how the phrase should be interpreted.
4. In claims 1, 3, and 5, the use of the word "incident" in the phrase "incident electromagnetic fields incident on the respective grid" is vague. It is unclear how the word incident should be interpreted in each instance.
5. In claim 1, 3, and 5, the use of the word "in" at the end of line 22, p. 20 (cl. 1), line 20, p. 22 (cl. 3) and line 20, p. 24 (cl. 5) are vague when read in light of "a living body is divided into grids" recited earlier in the claims.
6. In claim 3, the use of the phrase "previously storing model" is vague. It is unclear how the phrase should be interpreted.

7. In claim 5, use of the word "codes" in the phrase "codes described in" is vague. It is unclear to which "codes are being referred.
8. In claim 5, the use phrase " the data" is vague. It is unclear to which data is being referred.
9. In claims 2, 4, and 6 the phrase "electromagnetic wave protection indicating value" is vague. The meaning of this phrase is unknown.
10. Regarding claims 2, 4 and 6, the phrase "and the like" renders the claim(s) indefinite because the claim(s) include(s) elements not actually disclosed (those encompassed by "and the like"), thereby rendering the scope of the claim(s) unascertainable. See MPEP § 2173.05(d).
11. Claim 1 and 3 recite the limitation "data" in lines 10 and 12 of cl. 1 and lines 6, 8, and 10 of cl. 3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 112, First Paragraph

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

12. Claims 2, 4, and 6 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The factors to be considered in determining whether undue experimentation is required are summarized *In re Wands* 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988). The Court in *Wands* states: "Enablement is not precluded by the necessity for some experimentation such as routine screening. However, experimentation needed to practice the invention must not be undue experimentation. The key word is 'undue,' not 'experimentation.' " (*Wands*, 8 USPQ2d 1404). Clearly, enablement of a claimed invention cannot be predicated on the basis of quantity of experimentation required to make or use the invention. "Whether undue experimentation is needed is not a single, simple factual determination, but rather is a conclusion reached by weighing many factual considerations." (*Wands*, 8 USPQ2d 1404). The factors to be considered in determining whether undue experimentation is required include: (1) the quantity of experimentation necessary, (2) the amount or direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims. While all of these factors are considered, a sufficient amount for a *prima facie* case is discussed below.

Claims 2, 4, and 6 are drawn to the calculation of a wave protection value after the convergence of the electromagnetic compatibility calculation. The calculation of a wave protection value is separate and distinct from the specific absorption rates (SAR) used in the determination maximum permissible exposure to electromagnetic radiation. Many studies have been performed determining electromagnetic compatibility, e.g. Gandhi et al. (IEEE Transactions On Microwave Theory And Techniques, 44(10):1884-

1897, October 1996). The breadth of the claims are such that they encompass measuring the electromagnetic radiation scatter from any sort of living body that can be divided into 2mm x 2mm x 2mm cubes from which a grid could be formed with any type of device capable of executing the method such as an magnetic resonance imaging (MRI) machine. The nature of the invention relies on estimations of the electromagnetic wave radiation source, the scattering body, and region data to return a result of calculation and on an iterative step for performing the calculations. The iterative step has two potential outcomes, convergence or non-convergence. The convergence of iterative techniques occurs only when the interaction between the source and the dielectric body is weak (Bretones et al. IEEE Microwave and Guided Wave Letters, August 1998, 8(8):281-283). It is interpreted from the disclosure that the calculation of a wave protection value is dependent on convergence. Thus in light of the disclosure, if the MoM/FDTD calculation does not converge, then the calculation of a wave protection value fails. The specification provides no guidance to how the calculation of a wave protection value is carried out. The specification also provides no working example of the calculation of a wave protection value. A search of the art also provides no guidance as to how to calculate the wave protection value. Given the facts that the specification and the art provide no guidance to the calculation of a wave protection value, the calculation of a wave protection value is unpredictable and unknown. Further, one of ordinary skill in the art would not know how to perform the calculation of a wave protection value with out undue amount experimentation in the development of the wave protection value and methods of its calculation.

Claim Rejections - 35 USC § 103

13. Claims 1, 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bretones et al. (IEEE Microwave and Guided Wave Letters, August 1998, 8(8):281-283) as applied to claims 1, 3 and 5 above, further in view of Mangoud et al. (IEEE Transactions On Microwave Theory And Techniques, 48(11):2014-2021, November 2000), and further in view of Cerri et al. (*Int. J. Numer. Model.*, 12:245-256, 1999).

Claims 1, 3 and 5 are directed to a method of estimating electromagnetic compatibility in biological samples using estimated data in the calculations and employing a hybrid combination of the Method of Moments (MoM) and Finite Difference Time Domain analysis (FDTD). In the method of claim 1, 3 and 5, calculations are carried out using estimated data of position, electromagnetic source, region of analysis, dielectric constants, conductivity, and a grid dividing the scattering body. Claim 5 is further drawn to the application of the method of claim 3 in machine language that can be executed by a computer. Claim 1 is further drawn to an apparatus for the application of the method of claim 3.

Bretones et al. teach a hybrid combination of the MoM and FDTD to analyze electromagnetic interactions initiated by thin-wire antennas. Bretones et al. teach the modeling of the antenna, a source of electromagnetic waves, into segments (§ III, "segments", p. 282), the use of positional data (§ III, "located 5 cm from", p. 282), and dielectric data (§ III, "dielectric", p282). The model of the antenna and the dielectric data are used in the hybrid MoM/ FDTD analysis of a region.

Bretones et al. do not teach the iterative cycling between MoM and FDTD, the implementation of the hybrid method in computer executable machine language, apparatus or generation of a grid.

Mangoud et al. teach the application of a hybrid MoM/FDTD analysis to the interaction between mobile phone electromagnetic radiation and humans. In the method of Mangoud et al., a first MoM analysis is calculated, followed by a MoM/FDTD coupling step in which a fourier transform is applied to the MoM results before the results are passed to FDTD analysis. After FDTD analysis, a second coupling takes place in which an inverse Fourier transform converts the FDTD result to pass them back to the MoM analysis (§ III, ¶ 1, p. 2015-2016). According to Mangoud et al., the cycling is repeated until a steady state solution is obtained ("convergence of the results", p 2015). Mangoud et al. also teach the use of grids and meshes in the analysis of MoM/FDTD ("cell meshing", p. 2016). Mangoud et al also teach the implementation of the method in a computer executable machine language ("Computational cost of the hybrid technique", p. 2019-2020).

Cerri et al. teach the implementation of a hybrid MoM/FDTD analysis in both a computer executable machine language format ("in a PC" and "simulation code", p. 252) and as an apparatus ("using a high precision instrument", p. 252).

It would have been obvious to one of ordinary skill in the art to combine the MoM/FDTD hybrid and data of Bretones et al. with the iterative cycling, and grid generation of Mangoud et al. to create a method of estimating the electromagnetic

compatibility between a human and the electromagnetic radiation of a mobile phone or other device.

One of ordinary skill in the art would have been motivated to do so because it provides a very good method of assessing the safety of the interaction between electromagnetic devices and the human body ("safety assessment", Mangoud et al, 2nd ¶, conclusions, p. 2019), and would have reasonable expected success in view of the teachings of both Mangoud et al. and Bretones et al. of the application of hybrid MoM/FDTD analysis to the modeling of electromagnetic radiation.

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karlheinz R. Skowronek whose telephone number is (571) 272-9047. The examiner can normally be reached on Mon-Fri 8:00am-5:00pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Wang can be reached on (571) 272-0811. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MICHAEL BORIN, PH.D
PRIMARY EXAMINER

A handwritten signature in black ink, appearing to read "Michael Borin".